Electronic Version

Stylesheet Version v1.1.1

Description

[Insert title of invention]*Aseptic Disposable Sippy Style Beverage Container*

BACKGROUND OF INVENTION

[0001] The invention relates to shelf stable beverage containers produced using aseptic, hot-fill and retort packaging methods, having a flow controlled spout and incorporating a sippy cup design.

[0002] *BACKGROUND*

[0003] The beverage industry caters to consumers needs by using the appropriate packaging of its intended use and by fulfilling those needs with niche packaging such as sport nozzle cap bottles for athletes. One of these niches is children between the ages of about 1 year old and 5 years old. This demographic is one of the largest consumers of fruit juices, particularly, apple juice. For these consumers, ready-to-drink beverages are limited to juice and milk

boxes or pouches that require an external straw to puncture the packaging and access the beverage. However, this type of packaging is prone to spillage when a child tips the container over or squeezes the container side wall. A walk down supermarket beverage isle illustrates just how few choices besides straw technologies there are in the children"s ready-to-drink beverage category. So one the most often used alternatives are for parents to employ a conventional sippy cup by means of dispense a liquid from a larger container such as a 32 oz. or 64 oz. bulk jug into the child"s smaller sippy cup. In this manner, it appears that all sippy cups have to be manually filled by an adult. This leaves beverage manufactures with no viable way to deliver an appropriately sized product directly in the form of a ready-to-drink sippy cup that can easily be handled by a child consumer before they make the transition to adult cups and beverage containers.

[0004] For parents, conventional sippy cups have many drawbacks besides just having to be manually filled by an adult, they require washing after every use which is inconvenient and time consuming. Additionally, the valve systems in conventional sippy cups are usually manufactured with pliable silicon that warps when a sucking pressure is

applied by mouth and this allows the fluid to flow. These silicon valves that are typically inserted in to the lid become ineffective after a series of washings in a hot dish washer machine, the silicon being permanently warped out of shape. The need of numerous washings alone are enough for parents to abandon the valves altogether, the parents often takes out the silicon valve mechanism, albeit it, no longer having its 100% spill-proof attributes but rather just having the beverage"s flow restricted and allowing some acceptable drops of liquid to flow out when the cup is turned on its side and unattended. Yet another drawback of conventional sippy cups is when families are away from the house and the child drops their conventional sippy cup on the ground, parents are left with either finding a sink to clean the cup or letting the child drink from a soiled cup, for this reason, parents often travel with several sippy cups and rotate out their use as subsequent cups are drained or dropped. This is inconvenient for parents and is often a source of complaint.

[0005] Recently, disposable sippy cups have entered the market place to solve these types of issues. These disposable sippy cups can be summarized as a "Tupperware"type of container that are inexpensive and suitable for single or

multiple- use. Parents have widely adopted the use of these containers. However, they are not suitable for ready-to-drink packages, they are not pre-fillable or self-stable, having to be manually filled each time by an adult and share the same drawbacks of a traditional sippy cup less the silicon valve type mechanisms. Since parents are the ones to fill conventional or disposable sippy cups, this leaves the beverage manufactures limited to supplying bulk beverage containers, such as a 32 oz. container of apple juice that will eventually find their way into children"s sippy cups.

[0006] Beverage manufactures are eager to supply a niche packaging solution such as a pre-filled and shelf-stable for this demographic however the unique characteristics of sippy cups pose multiple challenges that makes it prohibitive, either from a cost standpoint or a technical aspect.

[0007] From the beverage manufactures point of view, any new packaging design should fit readily into their existing production lines and fill methods. The predominate methods for juice and diary-based beverages are hot-fill, aseptic and retort packaging methods. A "hot-fill" method is when a beverage is heated up to above 140 degree

Fahrenheit before being filled into a container. This is best suited for high acid juices such as apple or cranberry juices in glass or plastic containers. The second method is aseptic packaging; it uses all sterile food liquids and packaging materials in an ultra-clean environment and is better suited for low acid liquid foods such as dairy-based beverages because they can be packed at lower temperatures. The third method is retort packaging, this is best typified by the metal can industry where a food liquid is packed into its container, then boiled, to kill any pathogen causing microbes. Any commercially viable design for a pre-filled sippy cup must be versatile enough to fit into these major types of beverage manufacturing.

[0008] The hot-fill method is the beverage manufacturing leading technique for high-acid beverages, however, it best suited for glass because it can deform a plastic package when a hot liquid is filled and sealed using this method. This deforming is often called "rocker bottom"in plastic beverage containers because the heat tends to expand the container walls, then the container is sealed, later, it is left to cool down and contract and inasmuch, tends to collapse the bottom of containers so that they do not sit level on a shelf. Any possible solution to hot-filling a sippy

container must include contoured or reinforced walls to prevent product deformation or rocker bottom.

[0009] In the beverage container industry there is increasing regard for using aseptic packaging materials and methods to ensure the highest level of food safety and the benefit of enjoying longer shelf life the hot-filled beverages. This is accomplished in a variety of ways, typically in an enclosed sterile packaging environment and with an atmosphere at a positive air pressure above the prevailing surrounding atmosphere so the induction of pathogens is significantly reduced. The packaging material is sterilized prior to contacting the liquid food by steam, hydrogen peroxide bath or by pealable membrane to further reduce the induction of pathogenic microbes. Aseptic beverage packaging materials are almost exclusively of plastic materials. The aseptic packaging processes are those closely associated with using pathogen-free components, instead of solely relying on the application of heat to achieve sterilization, they use sterilized packaging materials in an ultra-clean environment to produce a container that is shelf-stable and does not typically require refrigeration to remain perishable. For these reason of creating a pathogen-free container, aseptic packaging is among the

most expensive methods know in the beverage industry but it allows for low acid products such as dairy based products to be packed without changing their quality or taste with the application of heat. It also eliminates the "rocker bottom"problem found in the hot-fill process.

[0010] Any possible solution to a pre-filled sippy container must include the ability to produce it using aseptic methods.

[0011] Another such means of producing a food liquid that will withstand these types of applied heat after being sealed is by means of retort packaging. Where by, the sealed container is boiled or subjected to a significant amount of heat such is widely practiced in Europe for milk that requires no refrigeration and is shelf stable for up to 6 months before being opened. If a significant amount of heat is applied, say enough to pasteurize the internal liquid during a retort process, to a plastic beverage container having a gases recess, it has a propensity to rupture the seal and there by ruining the product. Since sippy cups by definition have an up lifted spout with a flow restrictive design, this presents a formidable problem in a retort production line. The raised drinking spout creates an "air gap" above the liquid fill line that challenges traditional packaging techniques. This oxygenated air also

lends itself to being considered a contaminating agent because it could induce the growth of a pathogen microbe. Any solution regarding a retort capable sippy beverage packaging requires that no or very little air or gas remains in the container prior to the heating process.

[0012] Yet another problem of mass producing a pre-filled sippy cup is the liquid flow control valve. The often used silicon valve assemblies of conventional sippy cups would significantly increase the cost of production for a pre-filled sippy cup. Other designs are known to incorporate a "flip up"spout that the consumer actuates up or down to create a sort of on/off valve. This design is unsuited for the standard beverage industry production line. To accommodate such specialized features into a mass production beverage line would require prohibitively costly tooling and the individual component cost may make such a beverage offering economically unfeasible. In contrast to conventional sippy cups, the consumer available disposable sippy cups that have been widely adopted by parents, do not typically incorporate a valve or actuated spout, however, they are also not suitable for shelf-stable, pre-filled beverage packaging.

[0013] Thus, the beverage packaging industry currently lacks a

commercially-viable, pre-filled, disposable sippy cup suitable to be adopted by beverage manufactures.

[0014] The solution requirements are for a single-use, plastic material based, hot-filled, aseptic or retort capable, valve-less sippy cup, without an articulated spout or threaded unions, being easily fillable while fitting into pre-existing mass production lines and capabilities.

[0015] 2. *DESCRIPTION OF PRIOR ART*

[0016] The use of seal piercing lids that release a contained food liquid are know in prior art. More specifically, those with fluid controlled spouts devised and utilized for the purpose of dispensing an aseptically preserved food liquid are known to consist basically of familiar, predictable and obvious configurations, notwithstanding the myriad of designs encompassed by the crowded art which have been developed for the fulfillment of countless objectives and requirement.

[0017] By way of example, the prior art includes U.S. Pat. No. 6,598,757 to Stillinger et al. discloses a drink spout system for use with drink containers that pierces a seal across the opening in a drink container to access the fluid. The spout system has a valve assembly to regulate the flow and prevent unintentional spillage and is useful in

numerous aseptic drink containers such as drink boxes, pouches and bottles.

[0018] U.S.Pat. No. 6,474,506 to Mawby et al. discloses a dispensing container of a stiff deformable material that employees a convex lid with a piercing tooth that permanently ruptures a film.

[0019] U.S. Pat. No. 5,992,668 to Elliott teaches a closure for a container that includes a base and a lid having a dispensing orifice and penetrator member extending through the orifice while in the closed position and depressing the cap to engage the penetrator into the seal.

[0020] U.S. Pat. No. 5,482,176 to Maietta et al. which teaches a closure assembly able to piercing a diaphragm over a discharge opening in a container which can be a membrane seal over an aseptic package so that liquid can flow out of the container.

[0021] U.S. Pat No. 5,273,171 to Steele-Rowland et al. discloses a disposable nursing rectangular container having a puncture piece on the nipple assembly to pierce an access port on the top of a container so that liquid can flow into the nipple.

[0022] U.S. Pat No. 5,094,361 to Dubach which teaches of a rigid or deformable container that is protected by a seal and

having a pull up seal and a cutting element below the pouring spout which is actuated by the user upon opening the cap.

[0023] U.S. Pat No. 4,869,399 and 4,722,449 to Dubach also who additionally teaches of a plastic cap assembly that is installed on the neck of container this is sealed with a membrane and penetrator located on the underside of the base cap which penetrates the seal as is well-suited for readily for food products.

[0024] U.S. Pub. No. 20030085232 A1 by Leinenweber discloses a disposable beverage container that can be pre-filled is sealable and has an articulated valve sippy spout to dispense liquid. U.S. Pub. No. 20030066839A1 by Connors discloses*a* disposable child's drinking cup has a lid with a drinking spout defining multiple open holes sized to resist leakage in the absence of suction, such as by the development of surface tension at the holes, and to allow flow when suction is applied. The holes are formed during molding of the lid. U.S. Pub. No. 20030066839A1 by Holley discloses a spill resistant container (e.g., a sippy cup) including a flow control element including a membrane defining multiple pinholes for controlling the flow of liquid through a drinking spout.

[0025] Therefore, it can be appreciated that there exists a continuing need for a new and improved beverage container and in these regards; the present invention substantially fulfills this need.

Summary of Invention

[0026] One feasible solution for the problem to provide a single-use, plastic material based, hot-filled, aseptic or retort capable, valve-less sippy cup, without an articulated spout or threaded unions, being easily fillable while fitting into pre-existing mass production lines is to offer a beverage packaging container for food liquids that can be configured in different variations to meet the major beverage manufacturing methods of hot-fill, aseptic and retort production line requirements but still stay within basic overall design guidelines of a sippy cup. This is achievable by using a plastic container that can be easily formed with various methods, namely thermoforming, and using materials that adapt well to each manufacturing environment. For retort and aseptic packaging, a membrane sealed cup container, can withstand the forces on the retaining packaging materials when heated and a lid can be placed upon the cup that has a drink through sippy spout. In doing as much, a plastic-based container with a pealable or non-

pealable membrane seal over the opening can withstand the pressures of post-packaging, sterilizing heat without rupturing so that it either can be produced with an aseptic packaging process or a retort packaging process, which ever is least expensive or fits into a manufactures preferred process. This results in a pathogen-free, shelf-stable liquid food container exhibiting the desirable qualities that this invention envelopes. If it is desirable for the lid to be non-removable by the consumer, a cutting tool can be inserted between the lid and membrane before it is sealed, so the membrane can be ruptured and release the flow of liquid. For hot-filled methods, the sealing membrane is not necessary but the lid will have to be bonded to the cup, and a seal made over the sippy spout to make the finished product hermetically sealed.

[0027] Therefore, this invention intends to provide a suitable packaging design for beverage manufactures wanting to fulfill the children"s consumer niche with shelf-stable, pre-filled, disposable sippy cup style beverages.

[0028] The aseptic disposable sippy-style beverage container according to the present invention substantially departs from the conventional concepts and design of the prior art, and in so doing provides a beverage container pri-

marily developed for the purpose of dispensing a hot-filled, aseptic, retort or vacuum sealed liquid. One major departure is by mean of piercing a sealing membrane, in a novel offset manner with an enclosed cutting tool and having the lid return to the intended shape for communicating the liquid through a drinking spout and into the mouth. This sealing membrane may be pealable or non-pealable by the consumer depending on the configuration and the manufacturing methods used to produce it. Any similarity of the invention and prior arts is due to the parallel functions of a cup, lid and drinking spouts inasmuch as the limited basic forms are limited.

[0029] The invention is a beverage container having a sealed food liquid held by a membrane film. A cutting tool is concealed in the interior of a domed lid so that when the lid is depressed, the cutting tool pierces the membrane film and allows for the communication of liquid to flow through the drinking spout directly the mouth. The container is valve-less, has no articulated spouts, is without any straw technologies or threaded unions, is easily fillable and sealable and consists of a minimum number of thermoformed plastic components and seal film materials.

[0030] The present invention solves the above problems and ob-

jections in that a liquid food is sealed in to a "cup", the cup being sealed with a pealable or non-pealable membrane film, this portion of the assembly may be hot-filled, aseptic or retort capable. This membrane allows the food liquid to be sealed in a vacuum or a condition that significantly reduces any gases recesses. In configuration where the consumer does not have the means of separating the "cup" from the "lid", a functioning cutting tool is enclosed in the lid recess, capably of piercing the membrane near the cups periphery when the lid is depressed. In configurations where it is desirable for the consumer to have a removable lid, then the membrane would be pealable and removed before drinking. If it is desirable not to have a sealing membrane altogether for the food liquid and have the cup and lid bonded together, then that is possible also. The design features a valve-less spout rising from the lid. The drinking spout is sealed with a pull strip, pealable safety foil on the exterior. The entire container assembly is covered by a generic style cap to protect it from accidental compression and ensuring a tamper resistant closure along with protecting the container in transit and providing stack ability. The consumer would then be able to have a ready-to-drink, shelf stable sippy style cup

who"s operation would require that the 1) cap be removed, then 2) the protective spout foil seal be removed, then 3) consumed or in other aforementioned configurations, by 4) removing the lid and pealing the sealing membrane away before replacing the lid and consuming or 5) by depressing the lid and rupturing the sealing membrane, this would allow for the communication of liquid directly to the mouth via a flow restrictive sippy style drinking spout.

Brief Description of Drawings

[0031] Without restricting the full scope of this invention, the preferred form of this invention is illustrated in the following drawings:

[0032] FIG. 1 is a perspective view of a container according to the invention;

[0033] FIG. 2 is a plan view of the same container;F

[0034] FIG .3 is taken from FIG. 2, and showing enlarged cross section of the membrane film seal;

[0035] FIG. 4 is an enlarged section showing the drinking spout pull tab foil seal;

[0036] FIG. 5 is a perspective of the cutting tool;

[0037] FIG. 6 is an embodiment perspective, sectional view of the

container being depressed;

[0038] FIG. 7 is a representation of the cup being filled;

[0039] FIG. 8 is an alternative embodiment of the container with a decorative cutting tool; and

[0040] FIG. 9 is the preferred embodiment of a 6-pack of invention.

DETAILED DESCRIPTION

[0041] The following description is demonstrative in nature and is not intended to limit the scope of the invention or its application of uses.

[0042] There are a number of significant design features and improvements incorporated within the invention.

[0043] Referring to FIGS. 1-2, the container shown is these figures comprise a container body 1 and lid 2. The body 1 is slightly downwardly tapered having an open mouth at its top end and surrounded by a rim 4, which is shown as an outwardly directed curl or flange. The container body features a bottom contoured relief line 13 at the bottom of the cup and a side contoured relief line 15 two thirds up the cup"s side wall from the bottom to prevent deformation from its intended shape. The container body 1 may be of any suitable material or combination of materials,

but more usually being of a thermoplastic that is molded using conventional thermoforming processes, from a sheet material, commonly polypropylenes or co-extruded material combinations. The cup materials having a thickness of .005 to .055 inches are preferable.

[0044] The lid 2 having a convex dome exterior 2a with a drinking spout 5 located to one periphery and having a recessed tip 6 and singular or multiple hole openings 7 that allow communication to the interior. Drinking spout 5 is sized appropriately and contoured 5a to fit the mouth and teeth of the consumer. The lid rim 3 is in matching correspondence to cup rim 4 and having cutting tool receiver grove 19 running in parallel around the lid rim 3. The lid 2 is similarly thermoformed to that of the cup body 1 and incorporating the same or similar material and known to those schooled in the art. An optional air intake hole recess 20 is formed in a circular indention at the apex of the convex dome exterior 2a, the indention 20 dually acting as a guide nodule 21 contacting cutting tool 9 on the interior of the lid 2 when convex dome exterior 2a is depressed manually by the hand of the consumer (also represented in FIG. 6). The lid materials are of similar constitution as the cup and having a thickness of .005 to .055

inches.

[0045] As shown in Figure 5, the cutting tool 9 is located within the lid 2 and seated in position by either food grade adhesive or by a self-seating means whereby it is held in place by the membrane film 8 and the corresponding lid groove 19. The cutting tool 9 consists of a circular or semi-circular base 22, with single or multiple armatures 12, contoured to the recess of the lid and terminating in piercing head 10, that when depressed comes in to direct contact to the film membrane 8, and thus piercing the film membrane 8 in a predictable manner as shown in Figure 6. Optionally, a second cutting head 23 (not shown) may be employed to create second hole in the film membrane 8 closer the base 22 to provide air intake to the cup 1.

[0046] The membrane seal 8 materials, as shown in Figure 3, is a multilayer, co-extruded film having at least two layers. A commercially available material that would be usefully for this application is manufactured by ClearLam Corporation of Elk Grove Village, Illinois under the product code 50/115 PP and having a three layer construction and illustrated in FIG. 3. Many other commercially available materials may be used, having both a pealable or non-pealable

purpose.

[0047] The drinking spout lid 5 is over laid with a seal that is a pealable film 16 as shown in Figure 4 to create a protective cover that is promotes cleanliness and protects against spillage during transportation and handling prior to consumption. The pealable film seal 16 creates an air pocket within the recess of the lid 2 when it is sealed. The application of a depressing force on lid 2 is hampered by the increased air pressure so that it may not be fully depressible when pealable film seal 16 is covering the drinking spout 5 and covering the optional air intake nodule 20.

[0048] An over cap 17 attached to the lid 2 in a traditional manner as this is commonly know in the art.

[0049] In one embodiment to the invention, the cup 1 and the lid 2 are made of a clear, transparent polypropylene or similar material so that the end user can "see through" to the cutting tool 9 and the film membrane 8 of the lid material. The exterior facing cutting tool armature 11 may be molded into the shape of an animal or a character as shown in Figure 8 and the film membrane 8 having high quality graphics printed across its outer surface. During the assembly process, multiple floating beads may be

places in the recess before sealing the cup 1 to the lid 2. These beads would be sterilized, floatable and shaped into various forms such as animals, stars or various shapes. For example, the cutting tool exterior could be the shape of a bear, the film membrane may have a forest graphic with a bee hive printed on it and the beads could be the shape of bees. Once the film membrane is punctured, the bees would "swam" or swim around the lid recess as it fills and drains of the food liquid. This gives the user, preferably a child between the ages of 1 to 5 years of age, a fun and entertaining experience while consumer the beverage.

[0050] The invention is intended to be packaged and sold either individually or in multiples such as a "6-Pack of Sippy Cups"shown in Figure 9 or any number therein that is convenient for the multiple pack distribution of beverage containers. The multiple pack packaging may be of a card board over wrap, shrink wrap or with a traditional 6-pack ringed carrier or a combination of packaging know to those schooled in the art.

[0051] Yet another embodiment of the invention is a version where there is no cutting tool 9 and the cup 1 and lid 2 are not permanently sealed and the non-pealable film

membrane 8 is replaced with a pealable film membrane. In this configuration the end user would remove the lid 2, peal the membrane off the rim 4 and replace the lid 2 back on top of cup 1. This embodiment would give the consumer the option of reusing the cup 1 and lid 2 multiple times or refilling the liquid food beverage as needed. The invention would retain the same aseptic and retort capable qualities of the original embodiment of the invention prior to opening.

[0052] In any embodiment of the beverage container, the liquid fill process remains the same, as shown in Figure 7 the food liquid is filled using conventional fill processes into the cup 1 cavity through the open end of said cup 1. The sealing film membrane 8 is placed over the cup containing a food liquid and the sealing film membrane 8 is heat sealed to the cup rim 4 using applied pressure and creating a sealed liquid in a retained vacuum in the cavity, this process is know to those schooled in the art.

[0053] Alternative Embodiments

[0054] Yet another embodiment of the invention, the product could be produced with just the cup and the lid with a security seal strip over the sippy spout. In this embodiment, the cup would be "hot filled", typically of a high acid fruit

juice, the lid 2 would be heat sealed, adhesive sealed or by method of ultra-sonic welding to form the cup and the lid together to create a strong, air-tight bond. The security seal strip 16 would cover the sippy spout and any other openings such as an air intake hole 20. This seal strip 16 would be pealable by the consumer before consuming the product.And yet another embodiment of the invention would be the configuration of multiple units attached to one another at the cup rim when the cups are formed and having perforated attachments so that individually sealed units could be separated from a larger number of units. This way a consumer could "pop off" a sippy cup from a 6-pack (or more or less configured units) of pre-filled sippy cups, much in the same way that is popular with multiple packed units of consumer ready yogurt cup products. This particular embodiment would require a squared flanged style rim design (not illustrated) but well known to those skilled in the arts.

[0055] Although the present invention has been described in considerable detail with reference to certain preferred versions thereof, other versions are possible. Therefore, the point and scope of the appended claims should not be limited to the description of the preferred versions con-

tained herein.

[0056] As to a further discussion of the manner of usage and operation of the present invention, the same should be apparent from the above description. Accordingly, no further discussion relating to the manner of usage and operation will be provided.

[0057] With respect to the above description, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

[0058] Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.